Air Quality Permitting
Statement of Basis

May 16, 2007

Permit to Construct No. P-2007.0038

EnviroDyne Corporation, Wendell

Facility ID No. 047-00021

Prepared by:

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Air Quality Division

PUBLIC COMMENT

Table of Contents

Acronyms, Units, and Chemical Nomenclatures

AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
HAPs	Hazardous Air Pollutants
hp	horsepower
IDAPA	a numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
km	kilometer
lb/hr	pound per hour
MACT	Maximum Achievable Control Technology
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOx	nitrogen oxides
NSPS	New Source Performance Standards
O_3	ozone
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
Rules	Rules for the Control of Air Pollution in Idaho
scf	standard cubic feet
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SM	Synthetic Minor
SO_2	sulfur dioxide
T/yr	tons per year
$\mu g/m^3$	micrograms per cubic meter
UTM	Universal Transverse Mercator
VOC	volatile organic compound

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, Rules for the Control of Air Pollution in Idaho, for issuing permits to construct.

2. FACILITY DESCRIPTION

EnviroDyne Corporation will produce electricity from combustion of natural gas and distillate fuel oil in five Fairbanks Morse dual-fuel compression ignition internal combustion engines which will operate in low-NO_x mode. The engines will combust mostly natural gas, but a small percentage (1 %) of distillate fuel oil will be added for fuel ignition. The engines are capable of producing 12 megawatts of electricity, 2 megawatts of which will be used to power the facility while the remaining 10 megawatts will be sold to Idaho Power grid. The engines are expected to be run in a base-load mode and are expected to operate at all times except for maintenance shutdown or unexpected interruption. Natural gas will be supplied by underground pipeline to the facility and distillate No. 1 or 2 fuel oil will be transported to the facility and stored in a 12,000 gallon tank. Each of the five engines contain a separate exhaust consisting of an exhaust duct, silencer, and exhaust stack. A CO reduction oxidation catalyst system is used for each engine to control CO emissions.

3. FACILITY / AREA CLASSIFICATION

EnviroDyne Corporation is classified as a major facility under the Title V program in accordance with IDAPA 58.01.01.008.10.c because it emits or has the potential to emit NO_x, and CO at rates greater than 100 T/yr. The facility is not a designated facility as defined by IDAPA 58.01.01.006.30 and is not subject to PSD. The AIRS classification is "A"

The facility is located within AQCR 63 and UTM zone 11. The facility is located in Gooding County which is designated as unclassifiable for all regulated criteria pollutants (PM10, CO, NO_X, SO_2, lead, and ozone).

The AIRS information provided in Appendix A defines the classification for each regulated air pollutant at EnviroDyne Corporation. This required information is entered into the EPA AIRs database.

4. APPLICATION SCOPE

This permitting action is for the construction of five dual fuel internal combustion engines. Two of the five engines are 9-Cylinder, 2.3 megawatts (MW) each and the remaining three engines are 12-Cylinder, 3.07 megawatts (MW) each. The engines will combust pipeline quality natural gas and a small percentage of diesel (distillate No. 1 or 2 fuel oil) for pilot ignition. The engines are capable of producing up to 12 Megawatts (MW) of power production according to design.

4.1 Application Chronology

March 23, 2007	DEQ received 15-day PTC application
April 5, 2007	DEQ approved 15-day application to commence construction
April 19, 2007	DEQ determined application complete.
June 14, 2007	Draft permit sent to regional office for review.
June 18, 2007	Draft permit sent to facility for review.
July X, 2007	Public Comment period began

5. PERMIT ANALYSIS

This section of the Statement of Basis describes the regulatory requirements for this PTC action.

5.1 Equipment Listing

ID No.: Enviro 1
Manufacturer: Fairbanks Morse
Model: 9-Cylinder
Rated Power: 3,218 bhp
Fuel Types: Natural Gas with 1% distillate fuel oil for pilot ignition
Pollution Control Device: CO Reduction Oxidation Catalyst

ID No.: Enviro 2
Manufacturer: Fairbanks Morse
Model: 9-Cylinder
Rated Power: 3,218 bhp
Fuel Types: Natural Gas with 1% distillate fuel oil for pilot ignition
Pollution Control Device: CO Reduction Oxidation Catalyst

ID No.: Enviro 3
Manufacturer: Fairbanks Morse
Model: 9-Cylinder
Rated Power: 4,296 bhp
Fuel Types: Natural Gas with 1% distillate fuel oil for pilot ignition
Pollution Control Device: CO Reduction Oxidation Catalyst

ID No.: Enviro 4
Manufacturer: Fairbanks Morse
Model: 9-Cylinder
Rated Power: 4,296 bhp
Fuel Types: Natural Gas with 1% distillate fuel oil for pilot ignition
Pollution Control Device: CO Reduction Oxidation Catalyst

ID No.: Enviro 5
Manufacturer: Fairbanks Morse
Model: 9-Cylinder
Rated Power: 4,296 bhp
Fuel Types: Natural Gas with 1% distillate fuel oil for pilot ignition
Pollution Control Device: CO Reduction Oxidation Catalyst

5.2 Emissions Inventory

The actual criteria pollutants emissions of PM_{10}, SO_2, NO_2, and CO are summarized below in Table 5.1 summary of TAP emissions exceeding AAC or AACC EL values are summarized below in Table 5.2 detailed emissions inventory has been included in Appendix B.

Table 5.1 CRITERIA AIR POLLUTANT EMISSIONS SUMMARY

Emission Source	NO_x*		SO_2		CO*		PM_{10}		VOC	
	lb/hr	T/y	lb/hr	T/y	lb/hr	T/y	lb/hr	T/y	lb/hr	T/y
Enviro 1	7.10	31.05	0.60	2.82	8.40	36.94	2.30	9.87	5.70	24.84
Enviro 2	7.10	31.05	0.60	2.82	8.40	36.94	2.30	9.87	5.70	24.84
Enviro 3	9.50	41.45	0.90	3.76	11.30	49.32	3.00	13.17	7.60	33.16
Enviro 4	9.50	41.45	0.90	3.76	11.30	49.32	3.00	13.17	7.60	33.16
Enviro 5	9.50	41.45	0.90	3.76	11.30	49.32	3.00	13.17	7.60	33.16
Tank 1									.0004	.002
TOTAL	**42.7**	**186.45**	**3.90**	**16.92**	**50.7**	**221.8**	**13.6**	**59.25**	**34.2**	**149.16**

Total CO and NO_x emission limits are slightly higher in the permit. The higher emission limits were included as a buffer for emission limit compliance purposes, but will still comply with NAAQS and remain below PSD thresholds.

Table 5.2 TOXIC AIR POLLUTANTS EMISSIONS SUMMARY

Pollutant	Maximum Hourly Emissions – Sum of all emissions units (lb/hr)	Exceed Screening Emissions Level?
Benzene	9.37E-02	yes
Formaldehyde	9.53E-03	yes
Acetaldehyde	3.04E-03	yes
Benzo(a)pyrene	3.10E-05	yes
Total PAH	1.28E-02	yes

5.3 Modeling

The facility has demonstrated to the satisfaction of DEQ that air pollutant emissions associated with this project will not cause or contribute to a violation of any applicable ambient air quality standard. TAPs listed in Table 5.2 were modeled because their proposed emission rates exceeded the EL values of IDAPA 58.01.01.586. The facility provided a full impact analysis for PM_{10}, SO_2, NO_x and CO. A summary of all modeling results have been provided in Tables 5.3 and 5.4 below. A detailed modeling analysis has been included in Appendix C of this statement of basis.

All predicted ambient concentrations are less than or equal to 79% of acceptable standards.

Table 5.3 RESULTS FOR FULL IMPACT ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)	Total Ambient Impact ($\mu g/m^3$)	NAAQS[b] ($\mu g/m^3$)	Percent of NAAQS
PM_{10}[c]	24-hour	61.8[d]	46.6 (73)[e]	108.4 (134.8)	150	72 (90)
	Annual	11.8[f]	26	37.8	50	76
Sulfur Dioxide	3-hour	65.0[f]	34	99	1,300	8
	24-hour	19.7[f]	26	45.7	365	13
	Annual	3.6[f]	8	11.6	80	15
Carbon Monoxide	1-hour	936.6[f]	3,600	4,537	40,000	11
	8-hour	644.4[f]	2,300	2,944	10,000	29
Nitrogen Dioxide	Annual	39.7[f]	17	56.7	100	57

[a]Micrograms per cubic meter
[b]National ambient air quality standards
[c]Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d]Maximum 6th highest modeled concentration
[e]Conservative DEQ default background for rural / agricultural areas
[f]Maximum 1st highest modeled concentration

Table 5.4 RESULTS OF TAP ANALYSES

TAP	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)[a]	AAC/AACC[b] ($\mu g/m^3$)	Percent of AAC/AACC
Acetaldehyde	Annual	0.00265	0.45	0.6
Benzene	Annual	0.0813	0.12	68
Formaldehyde	Annual	0.00829	0.077	11
Benzo(a)pyrene	Annual	3.00E-5	3.00E-4	10
Total PAH	Annual	0.0111	0.014	79

[a]Micrograms per cubic meter
[b]Acceptable Ambient Concentration or Acceptable Ambient Concentration for a Carcinogen

5.4 Regulatory Review

This section describes the regulatory analysis of the applicable air quality rules with respect to this PTC.

IDAPA 58.01.01.201.....Permit to Construct Required

The facility's proposed project does not meet the permit to construct exemption criteria contained in Sections 220 through 223 of the Rules. Therefore, a PTC is required.

IDAPA 58.01.01.203.....Permit Requirements for New and Modified Stationary Sources

The applicant has shown to the satisfaction of DEQ that the facility will comply with all applicable emissions standards, ambient air quality standards, and toxic increments.

IDAPA 58.01.01.205.....Permit Requirements for New Major Facilities or Major Modifications in Attainment or Unclassifiable Areas

EnviroDyne Corporation is not a major facility for the purposes of the NSR/PSD program as defined under IDAPA 58.01.01.205.01 [40 CFR 52.21 (b)(1)(i)(a), (b) and (c)], as described below.

The facility has an uncontrolled PTE greater than 250 T/yr for CO and NO_x. However, the facility will operate engines in low-NO_x mode and use a CO reduction oxidation catalyst. There operating requirements will lower the facility's PTE for CO and NO_x to below 250 T/yr. The facility is not on the list of stationary sources specified in 40 CFR 52.21(b)(1)(i)(i.e., sources that have a PSD threshold of 100 T/yr), therefore, the PSD threshold for the facility is 250 T/yr. Table 5.1 above shows the pollutants with the highest PTE at the facility (CO at 221 T/yr and NO_x at 186 T/yr). These two pollutants are given a slightly higher limit in the permit as a buffer, but these limits are still less than 250 T/yr.

IDAPA 58.01.01.210.....Demonstration of Preconstruction Compliance with Toxic Standards

The applicant has demonstrated preconstruction compliance for all TAPs identified in the permit application.

IDAPA 58.01.01.224.....Permit to Construct Application Fee

The applicant satisfied the PTC application fee requirement by submitting a fee of $1,000.00 at the time the original application was submitted, March 23, 2007.

IDAPA 58.01.01.225.....Permit to Construct Processing Fee

The total emissions from the proposed new facility are 100 T/yr or more; therefore, the associated processing fee is $7,500.00. No permit to construct can be issued without first paying the required processing fee.

40 CFR 60 Subpart IIII .....Standards of Performance for Stationary Compression Ignition Internal Combustion Engines NSPS

Under 40 CFR 60.4200 (a)(3), the basis for applicability of this NSPS is stated to be "owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005."

The NSPS was not applicable to the facility because the internal combustion engines did not meet the definition of a modification or reconstruction for the purposes of the subpart, and other applicability criteria in the subpart did not apply to the facility.

40 CFR Part 64.....Compliance Assurance Monitoring (CAM)

CAM rules are applicable requirements for the internal combustion engines for Title V permitting purposes but it is not necessary to address them as part of this PTC. Instead, per 40 CFR 64.5(a)(1) the owner or operator shall submit information to comply with the CAM rules as part of the Tier I operating permit application. Details regarding applicability of the CAM rules are provided below.

Applicability is evaluated on a pollutant-specific basis for each emissions unit as follows:

- Under 64.2(a)(1), each engine is subject to emission limitations or standards, including the following: NO_x and CO for PSD avoidance.
- Under 64.2(a)(2), each internal combustion engine uses a control device to achieve compliance with the emission limitations and standards for CO. Part 64 does not apply with regard to any other regulated air pollutants because the engines do not use a control device to achieve compliance with any of the emission limitations or standards for those pollutants.
- Under 64.2(a)(3) the internal combustion engines have potential pre-control device emission of CO that are greater than 100 TPY.
- The CAM exemptions under 64.2(b) do not apply to this source.

IDAPA 58.01.01.313.01.b.....Timely Application, Original Tier I Operating Permits.

"For sources that become Tier I sources after May 1, 1994, that are located at a facility not previously authorized by a Tier I operating permit, the owner or operator of the Tier I source shall submit to the Department a complete application for an original Tier I operating permit within twelve (12) months after becoming a Tier I source or commencing operation..."

In accordance with IDAPA 58.01.01.313.01.b, you shall submit a complete application to DEQ for an initial Tier I operating permit within 12 months of becoming a Tier I source or commencing operation.

IDAPA 58.01.01676-677.....PM, Fuel Burning Equipment

This rule does not apply since an internal combustion engine is not considered to be "fuel burning equipment" as described by this rule. The term "fuel burning equipment" is defined by IDAPA 58.01.01.006.45 as "any furnace, boiler, apparatus, stack and appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer." An internal combustion engine is not considered to produce power "by indirect heat transfer", therefore, it is not considered to be "fuel burning equipment."

5.5 Permit Conditions Review

This section describes permit conditions developed as a result of this permitting action.

Permit Conditions 2.1 and 2.2 describe the processes, emissions units and associated emissions control devices.

Permit Condition 2.3 is a CO emission limit included to keep the facility as a synthetic minor (below 250 T/yr) for PSD regarding CO emissions. The CO emission limit is slightly higher in the permit than what is shown in the emissions inventory. The reason for this is to allow an emissions buffer for the facility, yet still comply with NAAQS and remain below PSD thresholds.

Permit Condition 2.4 is a NO_x emission limit included to keep the facility as a synthetic minor (below 250 T/yr) for PSD regarding NO_x emissions. This limit will also encourage the facility to use low NO_x mode when operating the engines. The NOx emission limit is slightly higher in the permit than what is shown in the emissions inventory. The reason for this is to allow an emissions buffer for the facility, yet still comply with NAAQS and remain below PSD thresholds.

Permit Condition 2.5 is an opacity limit as required by IDAPA 58.01.01.625.

Permit Condition 2.6 restricts fuels combusted and percentages of the fuels to be combusted. This requirement was included because emissions are based on these types and percentages of fuels.

Permit Condition 2.7 is a fuel sulfur content limit and included as required by IDAPA 58.01.01.728.

Permit Condition 2.8 requires installation of a CO reduction oxidation catalyst system for each engine. This requirement was included since emissions were determined based on a control device, and CO emissions are to remain below PSD thresholds.

Permit Condition 2.9 requires the permittee to install, calibrate, maintain, and operate a temperature monitoring device for control equipment. This requirement will provide information to demonstrate proper function of the CO reduction oxidation catalyst system.

Permit Condition 2.10 requires the permittee to develop an operations and maintenance manual. This requirement will aid to demonstrate proper function of the engines and control devices and ultimately to provide assurance that actual emissions from the facility will remain consistent with the estimates provided in the permit application to show compliance with applicable requirements. This also will help to ensure emission limits will not be exceeded.

Permit Condition 2.11 requires the CO reduction oxidation catalyst system to be operated at all times in accordance to manufacturer recommendations and the O & M Manual. This is required to meet CO emission limits and keep CO emissions below PSD thresholds as described in the permit application.

Permit Condition 2.12 requires the engines to operate in low NO_x mode. This is to control NO_x emissions below permit limits and below PSD thresholds.

Permit Condition 2.13 requires submittal of a Tier I Operating permit application in accordance with IDAPA 58.01.01.313.01.b.

Permit Condition 2.14 requires a performance test for CO and NO_x emissions within 180 days after startup and every two years thereafter. This requirement was developed based on IDAPA 58.01.01.157 and internal source test guidance. This requirement was included to demonstrate compliance with emission limits and facility classification as a synthetic minor for PSD avoidance.

Permit Condition 2.15 requires temperature monitoring and recording of the CO reduction oxidation catalyst systems to ensure proper function of the control devices.

Permit Condition 2.16 requires monitoring and recording of the type and percentage of fuel used to demonstrate compliance with Permit Condition 2.6.

Permit Condition 2.17 requires monitoring and recording of fuel sulfur content of the fuel oil to demonstrate compliance with Permit Condition 2.7.

Permit Condition 2.18 requires reporting of excess emissions.

Permit Condition 2.19 specifies general reporting requirements.

6. PERMIT FEES

The PTC application fee was received on March 23, 2007. In accordance with IDAPA 58.01.01.225, a permit to construct processing fee of $7,500 is due. A final permit cannot be issued until the processing fee is received.

Table 6.1 PTC PROCESSING FEE TABLE

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	205	0	205
SO_2	16.93	0	16.93
CO	249	0	249
PM_{10}	59.2	0	59.2
VOC	149.14	0	149.14
TAPS/HAPS	0	0	0
Total:	679.27	0	679.27
Fee Due	**$ 7,500.00**		

7. PERMIT REVIEW

7.1 Regional Review of Draft Permit

The draft permit was provided to the Twin Falls Regional Office on June 14, 2007. A discussion regarding modeling took place and some suggested minor changes to wording were incorporated into the PTC and Statement of Basis as a result of the regional review.

7.2 Facility Review of Draft Permit

The draft permit was provided to the facility and the facility's consultant for review on June 18, 2007. One comment regarding the facility location was received and incorporated into the PTC and Statement of Basis.

7.3 Public Comment

An opportunity for public comment period on the PTC application was provided from May 11 to May 25, 2007 in accordance with IDAPA 58.01.01.209.01.c. During this time, there were comments on the application and a request for a public comment period on DEQ's proposed action.

8. RECOMMENDATION

Based on review of application materials, and all applicable state and federal rules and regulations, staff recommend that EnviroDyne Corporation be issued PTC No. P-2007-0038 for it's electrical power generation facility in Wendell. The project does not involve PSD requirements.

TD/slm Permit No. P-2007.0038

Appendix A

AIRS Information

P-2007.0038

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Facility Name: **EnviroDyne Corporation**
Facility Location: **Wendell, Idaho**
AIRS Number: **047-00021**

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B						B	U
NO_x	A						A	U
CO	A	SM					A	U
PM_{10}	B						B	U
PT (Particulate)	B						B	U
VOC	A						A	U
THAP (Total HAPs)	B						B	U
			APPLICABLE SUBPART					

[a] **Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)**

[b] **AIRS/AFS Classification Codes:**

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, or each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

Appendix B

Emissions Inventory

P-2007.0038

	DEQ AIR QUALITY PROGRAM 1410 N. Hilton, Boise, ID 83706 For assistance, call the Air Permit Hotline - 1-877-5PERMIT	PERMIT TO CONSTRUCT APPLICATION Revision 2 02/14/2007
Company Name:	EnviroDyne Corporation/Wendell	
Facility Name:	EnviroDyne Corporation/Wendell	
Facility ID No.:		
Brief Project Description:	Construction of new power generation facility	

Please see instructions on next page before filling out the form.

SUMMARY OF FACILITY WIDE EMISSION RATES FOR CRITERIA POLLUTANTS - POINT SOURCES

		3.											
1.	2.	PM_{10}		SO_2		NO_X		CO		VOC		Lead	
Emissions units	Stack ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Point Source(s)													
9 Cyl Enviro Engine 1 (Dual Fuel)	ENVIRO1	2.30	9.87	0.60	2.82	7.10	31.05	8.40	36.94	5.70	24.84		
9 Cyl Enviro Engine 2 (Dual Fuel)	ENVIRO2	2.30	9.87	0.60	2.82	7.10	31.05	8.40	36.94	5.70	24.84		
12 Cyl Enviro Engine 3 (Dual Fuel)	ENVIRO3	3.00	13.17	0.90	3.76	9.50	41.45	11.30	49.32	7.60	33.16		
12 Cyl Enviro Engine 4 (Dual Fuel)	ENVIRO4	3.00	13.17	0.90	3.76	9.50	41.45	11.30	49.32	7.60	33.16		
12 Cyl Enviro Engine 5 (Dual Fuel)	ENVIRO5	3.00	13.17	0.90	3.76	9.50	41.45	11.30	49.32	7.60	33.16		
Diesel Tank	TANK1									0.00	0.00		
name of the emissions unit7													
name of the emissions unit8													
name of the emissions unit9													
name of the emissions unit10													
name of the emissions unit11													
name of the emissions unit12													
name of the emissions unit13													
name of the emissions unit14													
name of the emissions unit15													
name of the emissions unit16													
name of the emissions unit17													
name of the emissions unit18													
name of the emissions unit19													
name of the emissions unit20													
name of the emissions unit21													
(insert more rows as needed)													
Total		13.60	59.25	3.90	16.92	42.70	186.45	50.70	221.84	34.20	149.16		

Instructions for Form EI-CP1

Environdyne Power Project
Table 3 - 9-Cylinder Enviro Design Dual Fuel Engine

Engine Brake Horsepower	3,218	
Fuel Type	Natural Gas	
- maximum sulfur content (%)	0.0007	From http://www.ingaa.org/environment/pollutants.htm
Fuel Type	Distillate #2	
- maximum sulfur content (%)	0.5	
Maximum Firing Rate (gals/hr)		
Maximum Heat Input Rating (MMBtu/hr)	20.114	Manufacturer Rated Dual Fuel Performance
Maximum Hours of Operation	8,760	
Maximum Firing Rate (gals/yr)	0	
Heat Value of Fuel (Btu/gal)		
SCR Efficiency for NOx	0%	
Catalyst Efficiency for CO	65%	

			Uncontrolled Potential to Emit			Controlled Potential to Emit		
Criteria Pollutant	Emission Factor[1]	Units	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Total Particulate Matter (PM)[2]	0.0007	lb/bhp-hr	2.3	19,733	9.87	2.3	19,733	9.87
Nitrogen Oxides (NOx)	1.00	g/bhp-hr	7.1	62,092	31.05	7.1	62,092	31.05
Sulfur Oxides[3]	0.0002	lb/bhp-hr	0.6	5,638	2.82	0.6	5,638	2.82
Carbon Monoxide (CO)	3.40	g/bhp-hr	24.1	211,112	105.56	8.4	73,889	36.94
VOC	0.80	g/bhp-hr	5.7	49,673	24.84	5.7	49,673	24.84

			Uncontrolled Potential to Emit					
Compound	CAS Number		Emission Factor[4] (lb/MMBtu)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
Benzene	71-43-2		7.76E-04	1.56E-02	1.37E+02	6.84E-02	8.00E-04	Exceeds
Toluene	108-88-3		2.81E-04	5.65E-03	4.95E+01	2.48E-02	2.50E+01	Below
Xylenes	1330-20-7		1.93E-04	3.88E-03	3.40E+01	1.70E-02	2.90E+01	Below
Formaldehyde	50-00-0		7.89E-05	1.59E-03	1.39E+01	6.95E-03	5.10E-04	Exceeds
Acetaldehyde	75-07-0		2.52E-05	5.07E-04	4.44E+00	2.22E-03	3.00E-03	Below
Acrolein	107-02-8		7.88E-06	1.58E-04	1.39E+00	6.94E-04	1.70E-02	Below
Naphthalene	91-20-3		1.30E-04	2.61E-03	2.29E+01	1.15E-02	3.33E+00	Below
Benzo(a)pyrene*	50-32-8		2.57E-07	5.17E-06	4.53E-02	2.26E-05	2.00E-06	Exceeds
Total PAH[5]			1.06E-04	2.13E-03	1.87E+01	9.34E-03	9.10E-05	Exceeds

HAPs	0.131

Notes:
[1] Emission factors for all pollutants except SO_2 are from Performance Data sheet from Fairbanks Morse.Optimized for NOx emission factors are used.
[2] PM emission factor is assumed to equal PM_{10}. Conservative estimate based solely on diesel fuel, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1
[3] SO_x emission factor from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1
SOx EF calculation: 4.06E-04(.5)+9.57E-03(.0007) = 0.0002 lb/hp-hr
[4] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4.
[5] Total PAH is based on 1/2 the maximum amount of the pollutant (EPA Region X, 3/21/07)- EPA AP-42, Table 3.4-4
Based on less than symbol which means the compound was tested but not found in any measurable amount.

Environdyne Power Project

Table 1 - Potential to Emit Criteria Pollutant Summary

Modeling ID	Stationary Sources	Emission Rate (ton/year)						Emission Rate (lb/hr)					
		PM	PM-10	NOx	SO2	CO	VOC	PM	PM-10	NOx	SO2	CO	VOC
	Point Source												
	2 - 9 Cylinder Enviro Design Dual Fuel Engines	19.73	19.73	62.09	5.64	73.89	49.67	4.51	4.51	14.18	1.29	16.87	11.34
	3 - 12 Cylinder Enviro Design Dual Fuel Engines	39.51	39.51	124.34	11.29	147.96	99.47	9.02	9.02	28.39	2.58	33.78	22.71
	Diesel Tank						0.0						0.0004
	Total Stationary Sources	**59.25**	**59.25**	**186.43**	**16.93**	**221.85**	**149.14**	**13.53**	**13.53**	**42.56**	**3.86**	**50.65**	**34.05**
	Significant Emission Rates (10%)	**2.5**	**1.5**	**4.0**	**4.0**	**10.0**	**4.0**						
	Modeling Threshold	na	1.0	1.0	1.0	na	na	na	0.2	na	0.2	14.0	na
	Modeling Required		**Yes**	**Yes**	**Yes**				**Yes**		**Yes**	**Yes**	

Environdyne Power Project

Table 2 - Potential to Emit Toxic Pollutant Summary

Pollutant	9 Cyl -Enviro Engines - Dual Fuel (lb/hr)	12-Cyl Enviro Engines - Dual Fuel (lb/hr)	Diesel Tank Emissions (lb/hr)	Total TAPS (lb/hr)	IDAPA 58.01.01.585/ 586 - EL (lb/hr)	PTE Emission Rate vs. EL
Benzene	3.12E-02	6.25E-02	3.58E-07	9.37E-02	8.00E-04	**Exceeds**
Toluene	1.13E-02	2.26E-02	1.43E-05	3.40E-02	2.50E+01	Below
Xylenes	7.76E-03	1.55E-02	1.30E-04	2.34E-02	2.90E+01	Below
Formaldehyde	3.17E-03	6.35E-03		9.53E-03	5.10E-04	**Exceeds**
Acetaldehyde	1.01E-03	2.03E-03		3.04E-03	3.00E-03	**Exceeds**
Acrolein	3.17E-04	6.35E-04		9.52E-04	1.70E-02	Below
Naphthalene	5.23E-03	1.05E-02		1.57E-02	3.33E+00	Below
Benzo(a)pyrene*	1.03E-05	2.07E-05		3.10E-05	2.00E-06	**Exceeds**
Hexane			4.47E-08	4.47E-08	1.20E+01	Below
Ethylbenzene			5.82E-06	5.82E-06	2.90E+01	Below
Total PAH	4.26E-03	8.54E-03		1.28E-02	2.00E-06	**Exceeds**

Environdyne Power Project
Table 4 - 12 Cylinder Enviro Design Dual Fuel Engine

Engine Brake Horsepower	4,296	
Fuel Type	Natural Gas	
- maximum sulfur content (%)	0.0007	From http://www.ingaa.org/environment/pollutants.htm
Fuel Type	Distillate #2	
- maximum sulfur content (%)	0.5	
Maximum Firing Rate (gals/hr)		
Maximum Heat Input Rating (MMBtu/hr)	26.848	Manufacturer Rated Dual Fuel Performance
Maximum Hours of Operation	8,760	
Maximum Firing Rate (gals/yr)	0	
Heat Value of Fuel (Btu/gal)		
SCR Efficiency for NOx	0%	
Catalyst Efficiency for CO	65%	

			Uncontrolled Potential to Emit			Controlled Potential to Emit		
Criteria Pollutant	Emission Factor[1]	Units	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)
Total Particulate Matter (PM)[2]	0.0007	lb/bhp-hr	3.0	26,343	13.17	3.0	26,343	13.17
Nitrogen Oxides (NOx)	1.00	g/bhp-hr	9.5	82,892	41.45	9.5	82,892	41.45
Sulfur Oxides[3]	0.0002	lb/bhp-hr	0.9	7,527	3.76	0.9	7,527	3.76
Carbon Monoxide (CO)	3.40	g/bhp-hr	32.2	281,833	140.92	11.3	98,641	49.32
VOC	0.800	g/bhp-hr	7.6	66,314	33.16	7.6	66,314	33.16

			Uncontrolled Potential to Emit					
Compound	CAS Number		Emission Factor[4] (lb/MMBtu)	Emission Rate (lb/hr)	Emission Rate (lb/yr)	Emission Rate (ton/yr)	IDAPA 58.01.01.585/586 - EL (lb/hr)	PTE Emission Rate vs. EL
Benzene	71-43-2		7.76E-04	2.08E-02	1.83E+02	9.13E-02	8.00E-04	Exceeds
Toluene	108-88-3		2.81E-04	7.54E-03	6.61E+01	3.30E-02	2.50E+01	Below
Xylenes	1330-20-7		1.93E-04	5.18E-03	4.54E+01	2.27E-02	2.90E+01	Below
Formaldehyde	50-00-0		7.89E-05	2.12E-03	1.86E+01	9.28E-03	5.10E-04	Exceeds
Acetaldehyde	75-07-0		2.52E-05	6.77E-04	5.93E+00	2.96E-03	3.00E-03	Below
Acrolein	107-02-8		7.88E-06	2.12E-04	1.85E+00	9.27E-04	1.70E-02	Below
Naphthalene	91-20-3		1.30E-04	3.49E-03	3.06E+01	1.53E-02	3.33E+00	Below
Benzo(a)pyrene	50-32-8		2.57E-07	6.90E-06	6.04E-02	3.02E-05	2.00E-06	Exceeds
Total PAH[5]			1.06E-04	2.85E-03	2.49E+01	1.25E-02	9.10E-05	Exceeds

HAPs	0.175

Notes:
[1] Emission factors for all pollutants except SO_2 are from
[2] PM emission factor is assumed to equal PM_{10}. Conservative estimate based solely on diesel fuel, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1
[3] SO_x emission factor from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Table 3.4-1
SOx EF calculation: 4.06E-04(.5)+9.57E-03(.0007) = 0.0002 lb/hp-hr
[4] Toxic emission factors were utilized from EPA AP-42, Section 3.4 Large Stationary Diesel and All Stationary Dual Fuel Engines,Tables 3.4-3 and 3.4-4.
[5] Total PAH is based on 1/2 the maximum amount of the pollutant (EPA Region X, 3/21/07)- EPA AP-42, Table 3.4-4
Based on less than symbol which means the compound was tested but not found in any measurable amount.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Number 1
City:	
State:	
Company:	
Type of Tank:	Horizontal Tank
Description:	12,000 gallon AST, No. 2 fuel, 13-feet diameter, 12-feet tall.

Tank Dimensions

Shell Length (ft):	12
Diameter (ft):	13
Volume (gallons):	12,000.00
Turnovers:	1
Net Throughput(gal/yr):	12,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Boise, Idaho (Avg Atmospheric Pressure = 13.28 psia)

TANKS 4.0.9d

Emissions Report - Detail Format
Liquid Contents of Storage Tank

Number 1 - Horizontal Tank

		Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol Weight	Liquid Mass Fract
Mixture/Component	Month	Avg.	Min.	Max.		Avg.	Min.	Max.		
Distillate fuel oil no. 2	All	58.15	48.59	67.71	53.16	0.0061	0.0043	0.0084	130	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Number 1 - Horizontal Tank

Annual Emission Calcaulations	
Standing Losses (lb):	3.5886
Vapor Space Volume (cu ft):	1,014.51
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0696
Vented Vapor Saturation Factor:	0.9979
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,014.51
Tank Diameter (ft):	13
Effective Diameter (ft):	14.097
Vapor Space Outage (ft):	6.5
Tank Shell Length (ft):	12
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	0.0061
Daily Avg. Liquid Surface Temp. (deg. R):	517.8199
Daily Average Ambient Temp. (deg. F):	50.9208
Ideal Gas Constant R	
(psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	512.8308
Tank Paint Solar Absorptance (Shell):	0.54
Daily Total Solar Insulation	
Factor (Btu/sqft day):	1,400.54

Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0696
Daily Vapor Temperature Range (deg. R):	38.2221
Daily Vapor Pressure Range (psia):	0.0041
Breather Vent Press. Setting Range(psia):	0.06
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0061
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0043
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0084
Daily Avg. Liquid Surface Temp. (deg R):	517.8199
Daily Min. Liquid Surface Temp. (deg R):	508.2644
Daily Max. Liquid Surface Temp. (deg R):	527.3754
Daily Ambient Temp. Range (deg. R):	23.675
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9979
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0061
Vapor Space Outage (ft):	6.5
Working Losses (lb):	0.2277
Vapor Molecular Weight (lb/lb-mole):	130
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0061
Annual Net Throughput (gal/yr.):	12,000.00
Annual Turnovers:	1
Turnover Factor:	1
Tank Diameter (ft):	13
Working Loss Product Factor:	1
Total Losses (lb):	**3.9162**

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Number 1 - Horizontal Tank (VOC Emissions)

	Losses(lb/yr)		
Components	Working Loss	Breathing Loss	Total VOC Emissions
Distillate fuel oil no. 2	0.23	3.69	3.92

Source: EPA Tanks Emission Estimation Software Version 4.09D

Number 2 - Horizontal Tank HAPs

HAP	Diesel Liquid Phase Wt[1](%)	HAP Emissions (lb/hr)
Ethylbenzene	0.013	5.82E-06
Hexane	0.0001	4.47E-08
Benzene	0.0008	3.58E-07
Xylene (mixed)	0.29	1.30E-04
Toluene	0.032	1.43E-05

Notes:
[1] Liquid Phase Weight Percent, Volatile Speciation for Diesel based on Air Emissions Inventory Guide Document for Stationary Sources at Air Force Installations (USAF Instituet forEnvironment, Safety, and Occupational Risk Analysis, 1999)

Ex. Calculation: Ethylbenzene = ((3.92 lb/yr)*(0.013))/8,760 hr/yr = 5.82E-06 lb/hr

Appendix C

Modeling Review

P-2007.0038

M E M O R A N D U M

DATE: July 11, 2007

TO: Tracy Drouin, Air Quality Permitting Analyst, Air Program

FROM: Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT NUMBER: P-2007.0038

SUBJECT: Modeling Review for the EnviroDyne Corporation Permit to Construct Application for an electrical power generating plant Located near Wendell, Idaho

1.0 Summary

EnviroDyne Corporation (EnviroDyne) submitted a Permit to Construct (PTC) application for an electrical power generating facility proposed to be located near Wendell, Idaho. Air quality analyses involving atmospheric dispersion modeling of emissions associated with operations of the facility were submitted to demonstrate that the modification would not cause or significantly contribute to a violation of any ambient air quality standard (IDAPA 58.01.01.203.02 [Idaho Air Rules Section 203.02]). CH2M Hill (CH2M), EnviroDyne's consultant, conducted the initial ambient air quality analyses.

A technical review of the submitted air quality analyses was conducted by DEQ. The submitted modeling analyses: 1) utilized appropriate methods and models; 2) was conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed either a) that predicted pollutant concentrations from emissions associated with the proposed facility were below significant contribution levels (SCLs) or other applicable regulatory thresholds; or b) that predicted pollutant concentrations from emissions associated with the facility, when appropriately combined with background concentrations, were below applicable air quality standards at all receptor locations. Table 1 presents key assumptions and results that should be considered in the development of the permit.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES

Criteria/Assumption/Result	Explanation/Consideration
Analyses easily show compliance with all applicable standards	No specific permit requirements are necessary to assure compliance with air quality standards, beyond those normally included to assure operations are conducted as described in the application.

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The EnviroDyne facility will be located near Wendell, Idaho. The area is designated as attainment or unclassifiable for all criteria pollutants.

2.1.2 Significant and Full NAAQS Impact Analyses

If estimated maximum pollutant impacts to ambient air from the emissions sources associated with the proposed facility exceed the significant contribution levels (SCLs) of Idaho Air Rules Section 90, then a full impact analysis is necessary to demonstrate compliance with National Ambient Air Quality Standards (NAAQS) and

Idaho Air Rules Section 203.02. A full NAAQS impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any nearby co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual[f]	1.0	50[g]	Maximum 1st highest[h]
	24-hour	5.0	150[i]	Maximum 6th highest[j]
$PM_{2.5}$	Annual	Not established	15	Use PM_{10} as surrogate
	24-hour	Not established	35	Use PM_{10} as surrogate
Carbon monoxide (CO)	8-hour	500	10,000[k]	Maximum 2nd highest[h]
	1-hour	2,000	40,000[k]	Maximum 2nd highest[h]
Sulfur Dioxide (SO_2)	Annual	1.0	80[g]	Maximum 1st highest[h]
	24-hour	5	365[k]	Maximum 2nd highest[h]
	3-hour	25	1,300[k]	Maximum 2nd highest[h]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[g]	Maximum 1st highest[h]
Lead (Pb)	Quarterly	NA	1.5[i]	Maximum 1st highest[h]

[a]IDAPA 58.01.01.006.90
[b]Micrograms per cubic meter
[c]IDAPA 58.01.01.577 for criteria pollutants
[d]The maximum 1st highest modeled value is always used for significant impact analysis
[e]Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[f]The annual PM_{10} standard was revoked in 2006. The standard is still listed because compliance with the annual $PM_{2.5}$ standard is demonstrated by a PM_{10} analysis that demonstrates compliance with the revoked PM_{10} standard.
[g]Never expected to be exceeded in any calendar year
[h]Concentration at any modeled receptor
[i]Never expected to be exceeded more than once in any calendar year
[j]Concentration at any modeled receptor when using five years of meteorological data
[k]Not to be exceeded more than once per year

New source review requirements for assuring compliance with $PM_{2.5}$ standards have not yet been developed. EPA has asserted through a policy memorandum that compliance with $PM_{2.5}$ standards will be assured through an air quality analysis for the corresponding PM_{10} standard. Although the PM_{10} annual standard was revoked in 2006, compliance with the revoked PM_{10} annual standard must be demonstrated as a surrogate to the annual $PM_{2.5}$ standard.

2.1.3 Toxic Air Pollutant Analyses

Emissions of toxic substances are generally addressed by Idaho Air Rules Section 161:

> *Any contaminant which is by its nature toxic to human or animal life or vegetation shall not be emitted in such quantities or concentrations as to alone, or in combination with other contaminants, injure or unreasonably affect human or animal life or vegetation.*

Permit requirements for toxic air pollutants from new or modified sources are specifically addressed by Idaho Air Rules Section 203.03 and require the applicant to demonstrate to the satisfaction of DEQ the following:

> *Using the methods provided in Section 210, the emissions of toxic air pollutants from the stationary source or modification would not injure or unreasonably affect human or animal life or vegetation as required by Section 161. Compliance with all applicable toxic air pollutant carcinogenic increments and toxic air pollutant non-carcinogenic increments will also demonstrate preconstruction compliance with Section 161 with regards to the pollutants listed in Sections 585 and 586.*

Per Section 210, if the emissions increase associated with a new source or modification exceeds screening emission levels (ELs) of Idaho Air Rules Section 585 or 586, then the ambient impact of the emissions increase must be estimated. If ambient impacts are less than applicable Acceptable Ambient Concentrations (AACs) for non-carcinogens of Idaho Air Rules Section 585 and Acceptable Ambient Concentrations for Carcinogens (AACCs) of Idaho Air Rules Section 586, then compliance with TAP requirements has been demonstrated.

2.2 Background Concentrations

Background concentrations are used in the full NAAQS impact analyses to account for impacts from sources not explicitly modeled. Background concentrations were revised for all areas of Idaho by DEQ in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. Default rural/agricultural background concentrations were used for all criteria pollutants except 24-hour averaged PM_{10}. CH2M used a refined analysis of Rupert monitoring data, performed by Geomatrix Consultants for a different project, to generate a 46.6 $\mu g/m^3$ PM_{10} 24-hour background concentration. This value was based on the 95th percentile of monitoring results from January 1995 through June 2002, with "rare natural events" excluded (range fires and unusually high wind events).

CH2M did not provide a detailed justification of how the selected background value (95th percentile of all non-excluded values) is reasonably appropriate for the proposed power generation facility. Geomatrix suggested using season-specific 95th percentile values, with the highest value of 55.7 $\mu g/m^3$ for the summer season. Because there was no discussion of why it would be unreasonable to assume maximum modeled concentrations could occur with maximum monitored values, DEQ determined use of the 99th percentile (58.0 $\mu g/m^3$) would be more appropriate.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

This section describes the modeling methods used by the applicant and DEQ to demonstrate compliance with applicable air quality standards.

3.1.1 Overview of Analyses

Table 3 provides a brief description of parameters used in the submitted modeling analyses.

Table 3. MODELING PARAMETERS

Parameter	Description/Values	Documentation/Addition Description
Model	AERMOD	AERMOD with the PRIME downwash algorithm, version 07026
Meteorological data	1999-2003	Twin Falls, Idaho, surface data with Boise, Idaho, upper air data
Terrain	Considered	Receptor, building, and emissions source elevations were determined using Digital Elevation Model (DEM) files
Building downwash	Considered	The building profile input program (BPIP) was used
Receptor Grid	Grid 1	25-meter spacing along the property boundary out to 100 meters
	Grid 2	100-meter spacing out to 1,000 meters
	Grid 3	500-meter spacing out to 5,000 meters

3.1.2 Modeling protocol and Methodology

The submitted air impact analyses were conducted by CH2M. A modeling protocol was submitted to DEQ prior to the application. Modeling was generally conducted using methods and data presented in the protocol and the *State of Idaho Air Quality Modeling Guideline*.

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

3.1.3 Model Selection

Idaho Air Rules Section 202.02 require that estimates of ambient concentrations be based on air quality models specified in 40 CFR 51, Appendix W (Guideline on Air Quality Models). The refined, steady state, multiple source, Gaussian dispersion model AERMOD was promulgated as the replacement model for ISCST3 in December 2005. EPA provided a 1-year transition period during which either ISCST3 or AERMOD could be used at the discretion of the permitting agency. AERMOD must be used for all air impact analyses, performed in support of air quality permitting, conducted after November 2006.

AERMOD retains the single straight line trajectory of ISCST3, but includes more advanced algorithms to assess turbulent mixing processes in the planetary boundary layer for both convective and stable stratified layers.

AERMOD offers the following improvements over ISCST3:

- Improved dispersion in the convective boundary layer and the stable boundary layer
- Improved plume rise and buoyancy calculations
- Improved treatment of terrain affects on dispersion
- New vertical profiles of wind, turbulence, and temperature

AERMOD was used in the submitted analyses.

3.1.4 Meteorological Data

Surface meteorological data for 1999 through 2003, collected in Twin Falls, Idaho, were processed through AERMET with upper air meteorological data monitored in Boise, Idaho. These data were processed for use in a different permit application, and were provided to CH2M by DEQ.

3.1.5 Terrain Effects

Terrain effects on dispersion were considered in the analyses. Receptor elevations were obtained by CH2M using Digital Elevation Model (DEM) 7.5-minute files.

3.1.6 Facility Layout

The facility layout used in the modeling analyses, including the ambient air boundary, buildings, and emissions units, were checked against the proposed layout provided in the application. The layout used in the model was sufficiently representative of the proposed site layout.

3.1.7 Building Downwash

Downwash effects potentially caused by structures at the facility were accounted for in the dispersion modeling analyses. The Building Profile Input Program (BPIP) was used to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters for AERMOD.

3.1.8 Ambient Air Boundary

CH2M indicated the proposed site will be fenced to prevent unauthorized access. Ambient air was considered as all areas outside of the property boundary fence.

3.1.9 Receptor Network

Table 3 describes the receptor grid used in DEQ's refined analyses. The receptor grid met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined the receptor grid was adequate to reasonably resolve maximum modeled concentrations.

3.2 Emission Rates

Emissions rates used in the modeling analyses were equal to or somewhat greater than those presented in other sections of the permit application or the DEQ Statement of Basis.

3.2.1 Criteria Pollutant Emissions Rates

Table 4 provides criteria pollutant emissions rates used in the modeling analyses for both long-term and short-term averaging periods.

Table 4. EMISSIONS RATES USED FOR FULL NAAQS IMPACT MODELING

Emissions Point	Description	Emissions Rates (lb/hr)					
		PM_{10}[a] 24-Hour	PM_{10} Annual	SO_2[b] Short Term	SO_2 Annual	CO[c] Short Term	NOx[d] Annual
GEN1	9 cyl engine	2.25	2.25	0.644	0.644	8.43	7.09
GEN2	9 cyl engine	2.25	2.25	0.644	0.644	8.43	7.09
GEN3	12 cyl engine	3.01	3.01	0.859	0.859	11.26	9.46
GEN4	12 cyl engine	3.01	3.01	0.859	0.859	11.26	9.46
GEN5	12 cyl engine	3.01	3.01	0.859	0.859	11.26	9.46

[a.] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
[b.] Sulfur dioxide
[c.] Carbon monoxide
[d.] Nitrogen dioxide

3.2.2 TAP Emissions Rates

Table 5 lists applicable TAP emissions increases associated with the proposed facility. Emissions of TAPs not listed in Table 5 were below applicable screening emissions levels (ELs) and modeling was not required.

Table 5. EMISSIONS RATES USED FOR TAPS IMPACT MODELING

Emissions Point	Description	Emissions Rates (lb/hr)				
		Acetaldehyde	Benzene	Formaldehyde	Benzo(a)pyrene	PAH
GEN1	9 cyl engine	5.07E-4	0.0156	0.00159	5.17E-6	2.13E-3
GEN2	9 cyl engine	5.07E-4	0.0156	0.00159	5.17E-6	2.13E-3
GEN3	12 cyl engine	6.77E-4	0.0208	0.00212	6.90E-6	2.85E-3
GEN4	12 cyl engine	6.77E-4	0.0208	0.00212	6.90E-6	2.85E-3
GEN5	12 cyl engine	6.77E-4	0.0208	0.00212	6.90E-6	2.85E-3

3.3 Emission Release Parameters

Table 6 provides emissions release parameters for the submitted analyses including stack height, stack diameter, exhaust temperature, and exhaust velocity. Stack parameters are within reasonably expected values for the type of source. Further verification of parameters was not necessary because compliance with applicable standards was easily demonstrated, as described in Section 3.4 of this memorandum. Slight variation in the values of stack parameters listed will not change the compliance status of the analyses.

Table 6. EMISSIONS AND STACK PARAMETERS					
Release Point /Location	*Source Type*	*Stack Height (m)[a]*	*Modeled Diameter (m)*	*Stack Gas Temp. (K)[b]*	*Stack Gas Flow Velocity (m/sec)[c]*
GEN1	Point	9.8	0.9	661	20.9
GEN2	Point	9.8	0.9	661	20.9
GEN3	Point	9.8	0.9	661	27.9
GEN4	Point	9.8	0.9	661	27.9
GEN5	Point	9.8	0.9	661	27.9

[a]Meters
[b]Kelvin
[c]Meters per second

3.4 Results for Significant and Full Impact Analyses

CH2M elected to conduct full NAAQS impact analyses for all pollutants rather than initially conduct significant impact analyses. Table 7 presents results for the full NAAQS impact analyses. DEQ did not thoroughly review the appropriateness of CH2M's selection of 46.6 µg/m^3 as a 24-hour PM_{10} background concentration because compliance was easily demonstrated by using the conservative default background concentration of 73 µg/m^3. Compliance with NAAQS was easily demonstrated for all pollutants.

Table 7. RESULTS FOR FULL IMPACT ANALYSES						
Pollutant	**Averaging Period**	**Maximum Modeled Concentration (µg/m^3)[a]**	**Background Concentration (µg/m^3)**	**Total Ambient Impact (µg/m^3)**	**NAAQS[b] (µg/m^3)**	**Percent of NAAQS**
PM_{10}[c]	24-hour	61.8[d]	46.6 (73)[e]	108.4 (134.8)	150	72 (90)
	Annual	11.8[f]	26	37.8	50	76
Sulfur Dioxide	3-hour	65.0[f]	34	99	1,300	8
	24-hour	19.7[f]	26	45.7	365	13
	Annual	3.6[f]	8	11.6	80	15
Carbon Monoxide	1-hour	936.6[f]	3,600	4,537	40,000	11
	8-hour	644.4[f]	2,300	2,944	10,000	29
Nitrogen Dioxide	Annual	39.7[f]	17	56.7	100	57

[a]Micrograms per cubic meter
[b]National ambient air quality standards
[c]Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[d]Maximum 6th highest modeled concentration
[e]Conservative DEQ default background for rural / agricultural areas
[f]Maximum 1st highest modeled concentration

3.5 Results for TAPs Analyses

Compliance with TAP increments as required by Idaho Air Rules Section 210 were demonstrated by modeling uncontrolled TAP emissions increases associated with the new facility (those TAPs with emissions exceeding the ELs). Table 8 summarizes the ambient TAP analyses. TAP impacts from increased emissions associated with the proposed new facility are all below applicable AACs/AACCs, thereby demonstrating compliance with Idaho Air Rules Section 210.

Table 12. RESULTS OF TAP ANALYSES				
TAP	**Averaging Period**	**Maximum Modeled Concentration (µg/m^3)[a]**	**AAC/AACC[b] (µg/m^3)**	**Percent of AAC/AACC**
Acetaldehyde	Annual	0.00265	0.45	0.6
Benzene	Annual	0.0813	0.12	68
Formaldehyde	Annual	0.00829	0.077	11
Benzo(a)pyrene	Annual	3.00E-5	3.00E-4	10
Total PAH	Annual	0.0111	0.014	79

[a]Micrograms per cubic meter
[b]Acceptable Ambient Concentration or Acceptable Ambient Concentration for a Carcinogen

4.0 Conclusions

The ambient air impact analyses demonstrated to DEQ's satisfaction that emissions from the facility will not cause or significantly contribute to a violation of any air quality standard.